Renewable Energy Index

July 2018

Green Energy Markets, August 2018

Key highlights

The surge in renewable energy supply is reversing the spike in power prices

- **According to analysis for the Energy Security Board, wholesale power prices are forecast to almost halve over the next four years thanks to the addition of 7,200MW of extra large-scale supply from renewable energy since October 2016.** Australia's recent political chaos has been has been heavily influenced by politicians that claim increasing the amount of renewable energy in our power mix has been the cause of rapidly rising power prices. It is actually the opposite and a simple case of supply and demand.
- Prices began to rise upwards when large amounts of supply was withdrawn. In South Australia this began around October 2015 due to Alinta's withdrawal from the contract market in advance of its announced closure of Northern Power Station (546MW). For the rest of the National Electricity Market prices began escalating in mid-2016 as Engie withdrew supply from the contract market in advance of its announced closure of Hazelwood (1,600MW).
- In the period leading up to these large power price rises investment in additional large-scale renewable energy supply had largely dried up as a result of Abbott Government threats to wind back the Renewable Energy Target.
- It was only after prices began spiking upwards with the announced closure of Hazelwood that we saw significant commitments to construct new large-scale renewable energy supply. 7,200MW has been committed to construction since October 2016.
- Power prices have since begun to decline. This started initially in mid-2017 with an instruction by the Queensland Government for its generators to stop withholding supply that was pushing up prices. Prices have since continued to decline in anticipation of increasing amounts of renewable energy supply reaching construction completion and contributing power to the grid.
- Likewise rooftop solar PV installations were actually in decline in the period preceding the spike in power prices. Installations only rose up above 2014 levels once wholesale power prices starting spiking upwards. As these have flowed through to end-consumer retail prices households and businesses have rushed to install solar at all time record levels as a source of cheaper electricity.
- Other consumers have also benefited as this additional supply of electricity from rooftop solar has acted to provide a source of new competition in both wholesale and retail electricity markets, rather than the illusion of competition through confusing discounts.

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About this report

The Green Energy Markets' Renewable Energy Index tracks on a monthly basis the amount of renewable energy Australia relies on, the jobs it's creating, the power bill savings it is delivering for Australian households, and the environmental benefits of the rising use of clean power.

This edition covers the period of July 2018.

The Renewable Energy Index is funded by GetUp! to provide a reliable, up-to-date record on renewable energy's contribution to Australia.

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What renewable energy is contributing to the grid

1. The NEM electricity price spike has now reversed and prices are in decline

Figure 1: Energy Action Price Index (Business) which tracks the average energy price of retail electricity paid by Australian businesses based on a Standard Retail Contract (commences in 6-months and operates for 2½ years). See http://www.energyaction.com.au for details.

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2. The rise in power prices was preceded by a drought in renewable energy investment. With the surge in supply now coming on stream power prices are now declining.

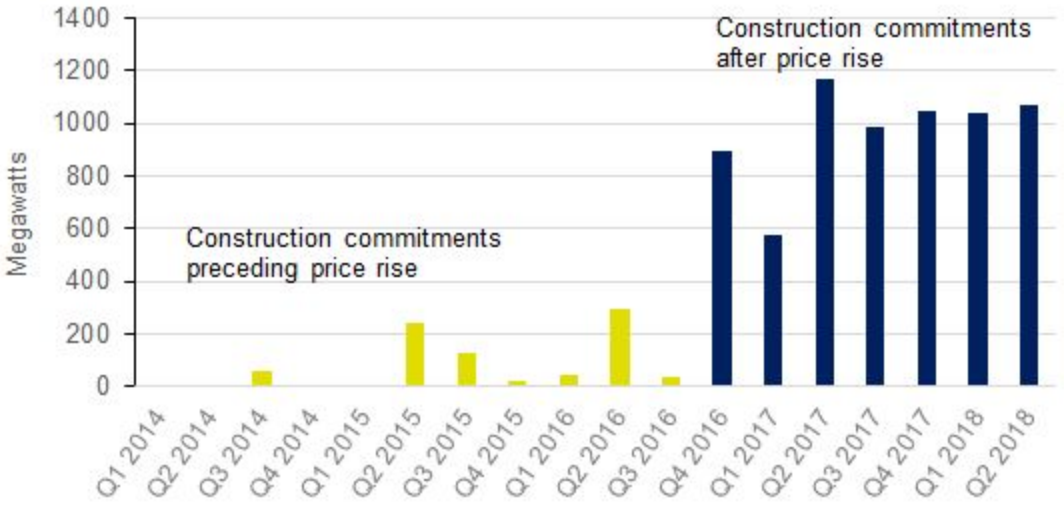

Figure 2: Large-scale renewable energy capacity committed to construction by quarter in NEM states

3. Households and businesses have flocked to solar as a solution to spiking power prices

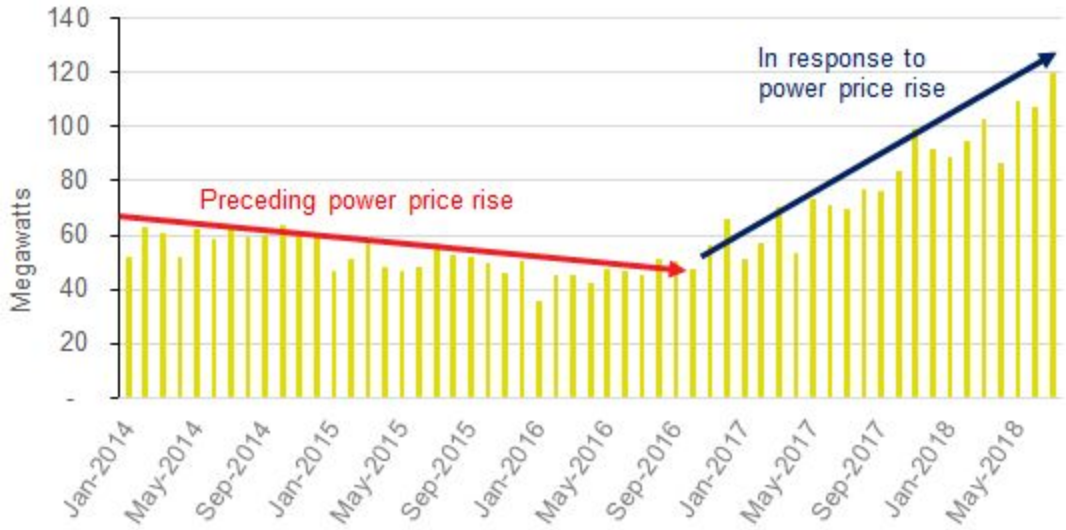

Figure 3: Rooftop solar PV capacity installed by month in NEM states

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4. In July renewables made up 23.3% of the electricity generated in Australia's main grids

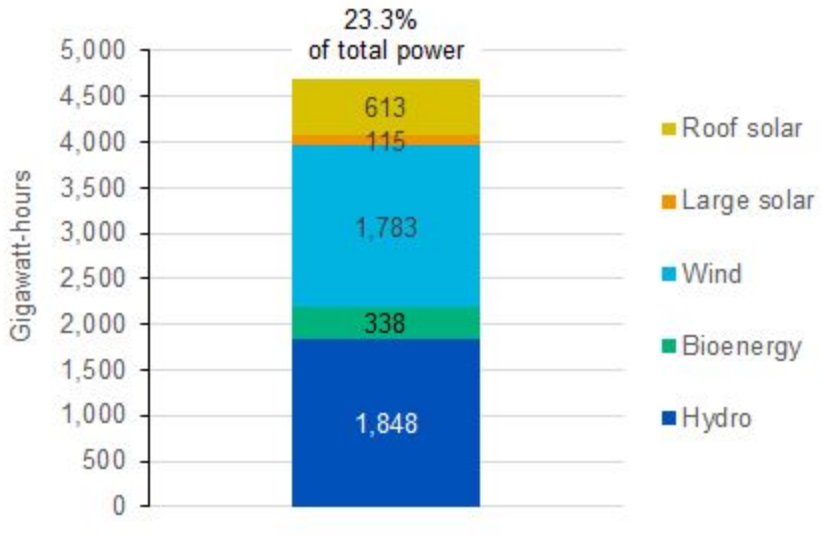

Figure 4: Renewable energy power generation by fuel & market share for west & east coast power grids – July 2018

5. Enough renewable energy over July to power 11.1 million homes

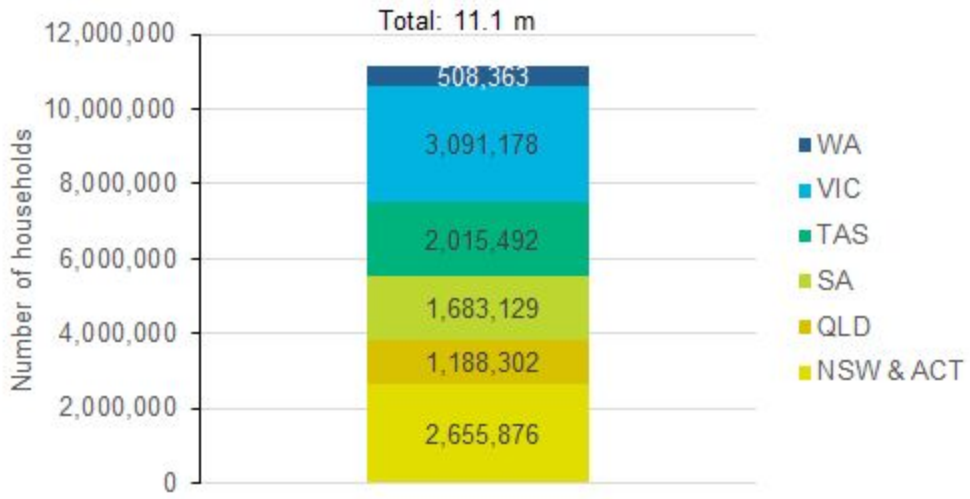

Figure 5: Renewable energy power generation July 2018 in terms of number of households' power consumption by state

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6. Renewable energy avoided 2.9 million tonnes of CO2 pollution in July

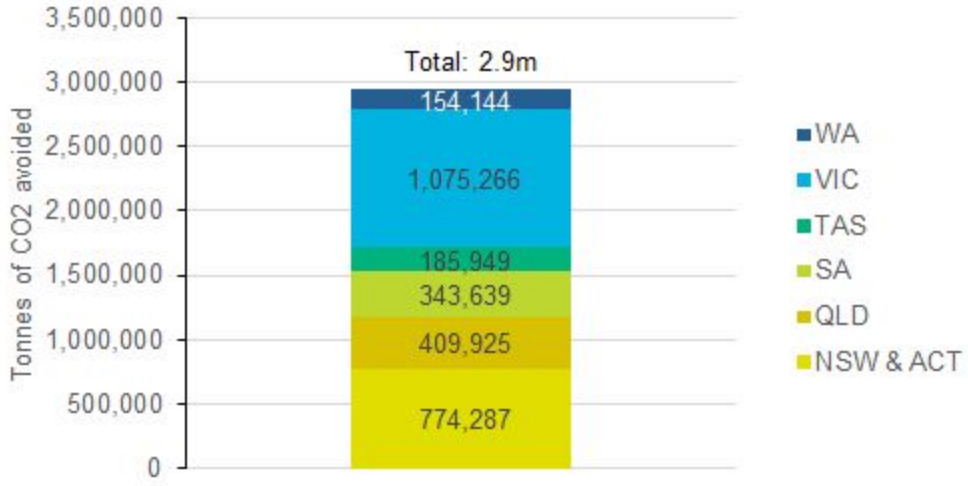

Figure 6. CO2 pollution avoided by renewable energy generation over July 2018

7. Renewable energy avoided 11.2 million cars' worth of CO2 pollution in July

Figure 7. Number of cars' CO2 pollution avoided by renewable energy generation over July 2018

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Large-scale renewables construction activity

8. 6,244 megawatts of large-scale renewables currently under construction

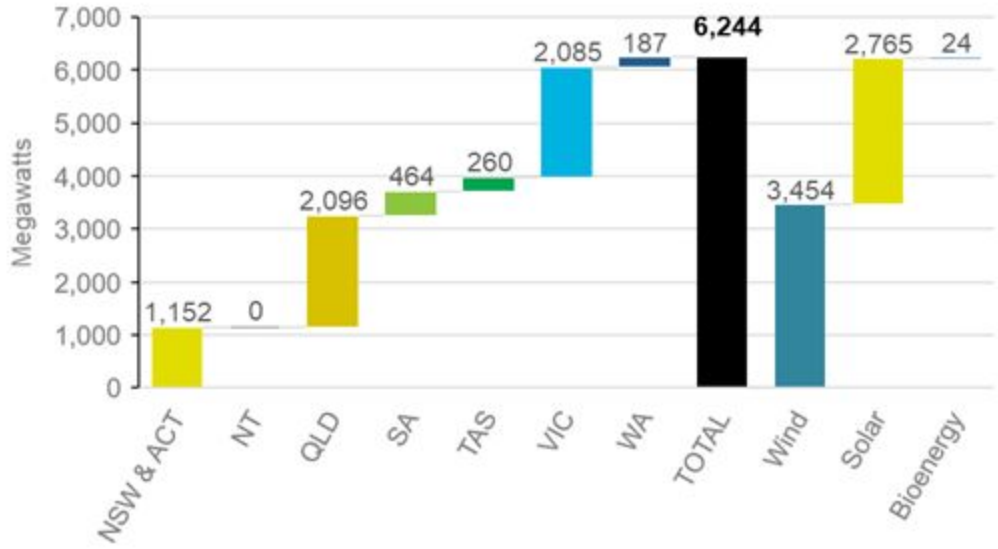

Figure 8: Megawatts of large-scale renewable energy projects under construction by state and fuel at end of July 2018

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9. Enough work to employ 15,666 people

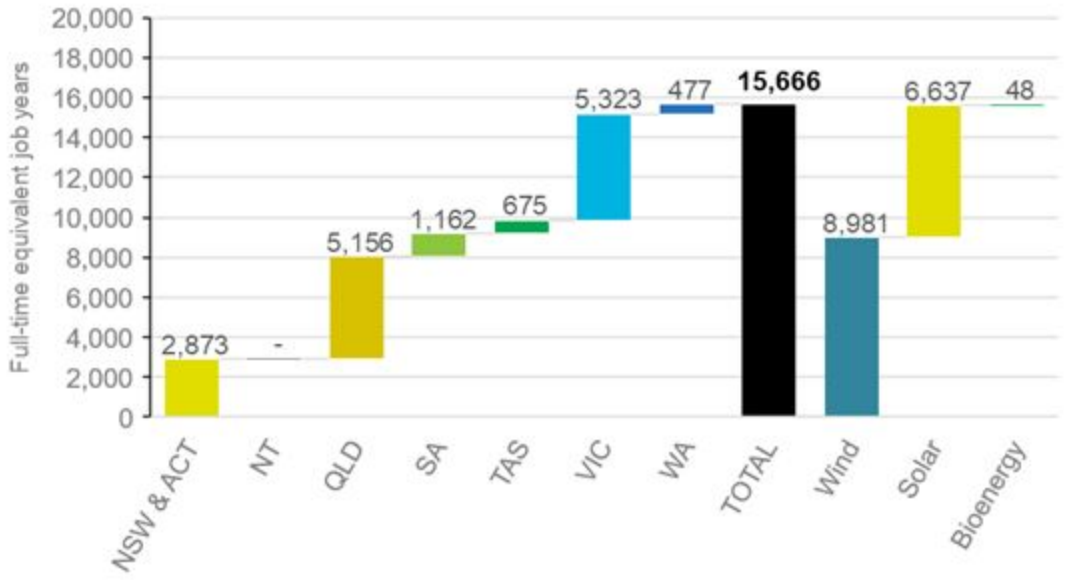

Figure 9: Job-years created by renewable energy projects currently under construction by state and fuel - as at end of July 2018

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Rooftop solar installation activity

10. 18,384 small-scale solar systems installed in July

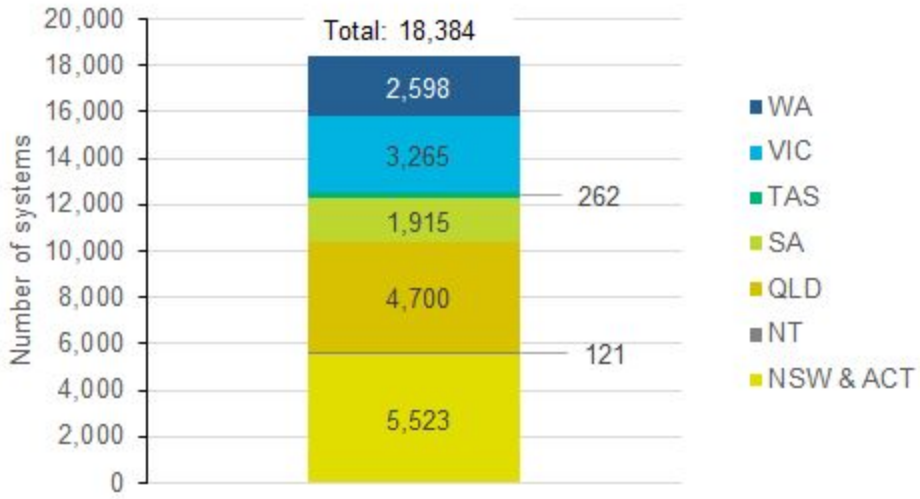

Figure 10: Small-scale solar PV systems installed by state - July 2018

11. Rooftop solar employed 6,413 people in July

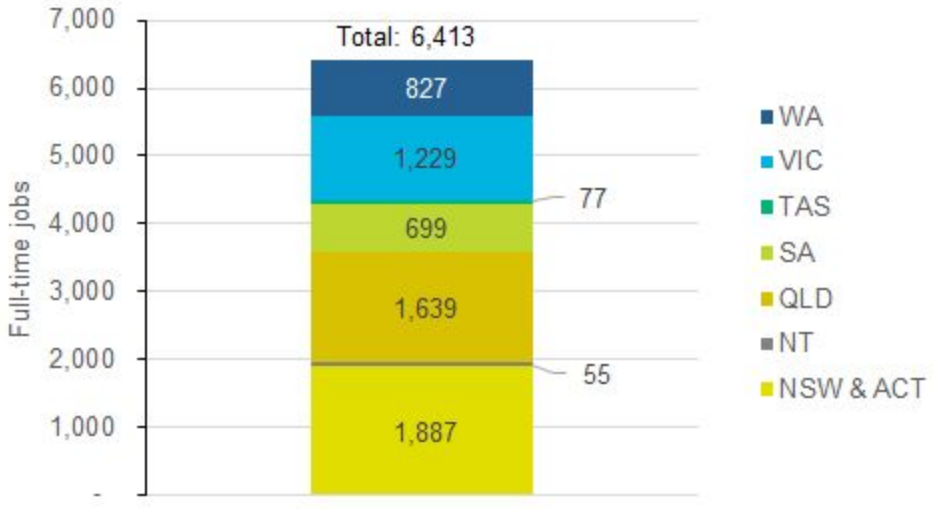

Figure 11. Number of full-time equivalent jobs by state in the installation and sale of rooftop solar PV systems installed over July 2018

12. Enough rooftop solar installed in July to power 39,565 homes

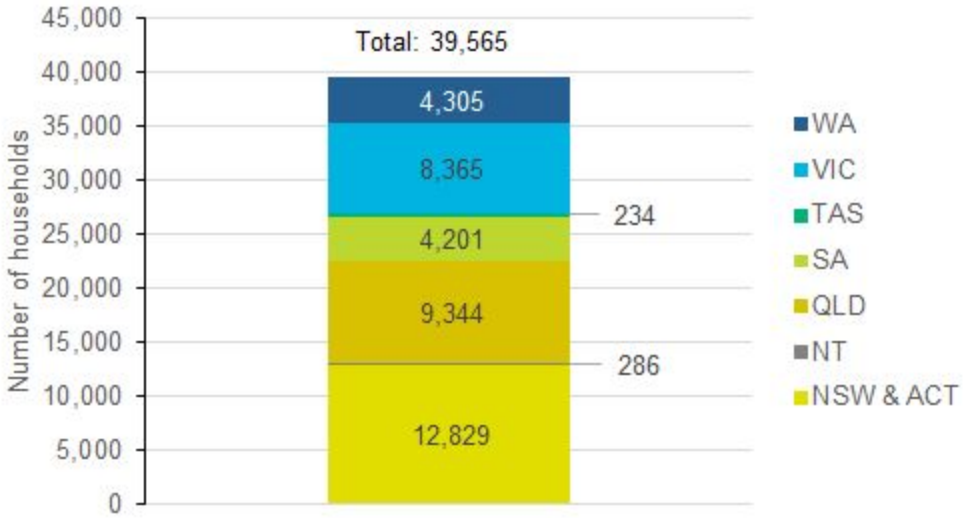

Figure 12: Expected generation from solar systems installed over July in terms of number of households' power consumption

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13. Rooftop solar installed in July will deliver $241 million in bill savings

Figure 13: Power bill savings (in $millions) over next ten years from rooftop solar systems installed in July 2018

Notes on sources and methodology

Figure 1 – Chart is taken from Energy Action's Price Index. It represents the average energy price component of retail electricity paid by Australian businesses based on a Standard Retail Contract (commences in 6-months and operates for 2½ years). It is created from the lowest cost offers submitted by retailers via the Australian Energy Exchange (AEX) and reflects the cost of commodity electricity to commercial and industrial customers. For further information visit: http://www.energyaction.com.au/energy-procurement/aex-reverse-auction/energy-action-price-index .

Figure 2 - This data is sourced from Green Energy Markets' Power Plant Register which tracks information on every renewable energy project in the country that is currently registered or likely to register under the Large-Scale Renewable Energy Target. Megawatts are listed according to the month in which the project was confirmed that it would proceed to construction.

Figure 3 - Data sourced from Green Energy Markets' Solar Report based on the creation date of Small Scale Technology Certificates associated with solar PV systems with data extracted from the Clean Energy Regulator's registry of Small Scale Technology Certificates. Kilowatts of capacity are derived from the number of Small Scale Technology Certificates based on an assumed average deeming rate per state.

Figure 4 – Data sourced from the Australian Energy Market Operator (AEMO) via NEM Review for all power except rooftop solar PV generation in the WEM. Rooftop solar PV generation in the WEM is derived from an estimate of the cumulative installed capacity in WA multiplied by a generic capacity factor for each month derived from AEMO's 2017 WA Electricity Statement of Opportunities with a discount to align it with Clean Energy Regulator estimates for solar PV annual average generation.

Figure 5 – This chart is calculated by dividing the amount of renewable energy produced in each state by the average annual electricity consumption of households in that state which are sourced from the Australian Energy Market Commission's 2016 Residential Electricity Price Trends publication.

Figure 6 – This chart is calculated by multiplying the amount of renewable energy produced in each state by the average emissions intensity of grid power in that state sourced from the Australian Government's National Greenhouse Accounts Factors – July 2017. Readers should note this is an approximate measure because estimating abatement precisely depends on a complex array of factors. The method employed in the Index is highly likely to underestimate

abatement delivered by renewable energy in Tasmania and South Australia while potentially overestimating abatement in Victoria and to a lesser extent other states.

Figure 7 – This chart is calculated by dividing the estimated tonnes of CO2 avoided by renewable energy generation by the average emissions of an Australian passenger car. The average annual emissions of an Australian passenger car was derived by dividing the total CO2 emissions of Australia's passenger cars sourced from the Australian Government's 2016 Emissions Projections by the number of passenger vehicles in Australia as estimated in the Australian Bureau of Statistics' 2016 Motor Vehicle Census (31 Jan 2016).

Figure 8 – This data is sourced from Green Energy Markets' Power Plant Register which tracks information on every renewable energy project in the country that is currently registered or likely to register under the Large-Scale Renewable Energy Target.

Figure 9 – This chart is calculated by multiplying the number of megawatts under construction by an estimate of the job years (a person employed full-time for a year) involved in constructing renewable energy projects by fuel type. Readers should note that for wind projects we have adjusted the assumed job years per megawatt downwards commencing from July 2018 onwards compared to prior editions of the Renewable Energy Index as a result of more up to date information. This is based on a review of employment estimates from a range of Australian wind farms and data on employment involved in wind tower manufacture. Estimated employment in solar farm construction is based on discussions with construction industry participants. Bioenergy construction employment factors were sourced from analysis undertaken by University of Technology Sydney for the Climate Institute. Readers should note that job estimates provided by individual project proponents may not align due to inconsistent definitions of how to measure job creation that are not necessarily reported in job-years.

Figure 10 - Data sourced from Green Energy Markets' Solar Report based on the creation date of Small Scale Technology Certificates associated with solar PV systems with data extracted from the Clean Energy Regulator's registry of Small Scale Technology Certificates.

Figure 11 – This chart is calculated by sorting solar PV systems into different kilowatt size categories using information sourced from the Green Energy Markets Solar Report using data extracted from the Clean Energy Regulator's register of Small Scale Technology Certificates. These are then multiplied by estimates of the average person-hours involved in selling, designing and installing such sized systems based on a Green Energy Markets' survey of solar PV industry participants which is then converted into full-time equivalents working a 37.5 hour work week.

Figure 12 - This chart is calculated by using data on the number of small-scale technology certificates within the Clean Energy Regulator's registry as a proxy for the expected average

annual power generation from solar PV systems installed in each state. This is then divided by the average annual electricity consumption of households in that state which are sourced from the Australian Energy Market Commission's 2017 Residential Electricity Price Trends publication.

Figure 13 - This chart is calculated by using data on the number of small-scale technology certificates within the Clean Energy Regulator's registry as a proxy for the expected average annual power generation from solar PV systems installed in each state. To determine how much of this generation is displacing imported power from the grid at retail rates or exported to the grid where it receives a feed-in tariff tied to wholesale electricity prices, systems are sorted into different kilowatt size categories using information sourced from the Green Energy Markets Solar Report using data extracted from the Clean Energy Regulator's register of Small Scale Technology Certificates. The amount exported by solar power systems rises from 50% for 2 kilowatts systems up to 90% for 8-10kW systems based on advice received from the Alternative Technology Association. Systems larger than 15kW are assumed to only avoid or receive an electricity rate equal to the export feed-in tariff we estimate for residential customers in each state. The imported retail rate of electricity and the export feed-in rate is based on an average of the AGL, Origin and EnergyAustralia lowest post-discounted published offer for the capital cities in the states of QLD (Energex), NSW (Ausgrid), VIC (Citipower) and SA (SA Power Networks). For Tasmania, WA, ACT and NT we use the regulated and standard feed-in tariff rates of the Government-owned retailer in each state.